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A CLINICAL PSYCHOLOGICAL STUDY OF INVERTED VISUAL FIELD 1/1  
BY INVERSING PRISMS(U) FOREIGN TECHNOLOGY DIV

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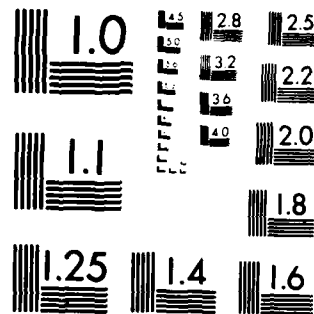
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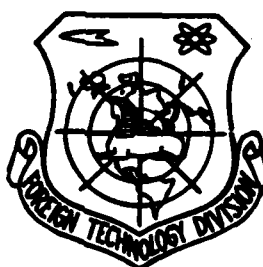
# FOREIGN TECHNOLOGY DIVISION



A CLINICAL PSYCHOLOGICAL STUDY OF INVERTED VISUAL FIELD  
BY INVERSING PRISMS

by

Masahiro Fujiwara, Takehisa Nakao, et al



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# EDITED TRANSLATION

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A CLINICAL PSYCHOLOGICAL STUDY OF INVERTED VISUAL  
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By: Masahiro Fujiwara, Takehisa Nakao, et al

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## ABSTRACT

By far the most popular of the various recombination procedures is the optical rearrangement of vision as a means of investigating spatial perception and perceptual motor coordination.

A classic study of adaptation to rearranged vision was made by Stratton, who carefully noted his own initial and subsequent responses to 180° rotation of the visual field over exposure periods lasting several days. In Stratton's type of experiment, the alternation of the dynamic relationship between head and visual field proved itself to be of greater importance than the static inversion and/or reversal of visual orientation.

On the other hand, there is another theory that adaptation to inverted stimuli from the external world can take place even though objects are not perceived upright. Thus, there has been no definite explanation of this phenomenon as yet.

The present experiment was conducted to study the process of adaptation, using inverting prisms. Subjects were four healthy students of Miyazaki Medical College. During a one-week stay in the psychiatric ward of Miyazaki Medical College Hospital, they underwent various psychological tests while using inverting prisms.

The results were as follows: As for perceptive adaptation, there was no completely upright vision of the external world, nor any upright vision subject to the all-or-none law.

The data of psychological tests (Kraepelin test, Bender-Gestalt test, etc.) were improved in the course of the adaptation to inverted vision.

As to the Rorschach test, "vista" and "eye" response increased in the course of the adaptation.

As to the DAP test, self-image was gradually integrated.

These results suggest that perceptive adaptation is based on integration of visual and somatosensory (bodily felt) coordination.

Based on the results mentioned above, the significance of psychological process of recovery from inverted vision was discussed.

(Arthurs' abstract)

## A CLINICAL PSYCHOLOGY STUDY OF INVERSED VISUAL FIELD BY INVERSING PRISMS

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Department of Psychiatry, Miyazaki Medical College

### INTRODUCTION

"If the retina perceives the outer world in an inverted manner, why do we not also perceive the world upside down?" Much research has been done regarding inverted vision ever since this simple question was first raised in the 16th century.

At the end of the 19th century, G. M. Stratton (1896, 1897)[15][16][17] performed an experiment by wearing reversing lenses for eight days; as a result, he reported that his vision became upright and that body movement contributed greatly to the adaptation process from inverted to upright vision. However, according to a subsequent experiment done by P. H. Ewert (1930) and associates[1], even though complete adjustment may be made regarding action, vision is still perceived in an inverted manner as before. In our own country [Japan], Makino (1963)[6] wore reversing lenses himself for nine days,

and says that correct visual perception of space brought about by an adaptation is not continuous, but is intermittent and unstable. He reports, "Based on my own orientation at the outset of the experiment, the visual space based on the framework of visual space and conversion to my orientation seem to be perceptual adaptation towards inverted vision." Also, according to Nakamura (1979)[11], adaptation to inverted vision involves disorganization of "visual unity" and unification of "organizational senses" (not just touch, but also senses such as muscular feeling and feeling of movement). At the second stage, "visual unity" is reconstructed on the basis of "unity of organizational senses," and visual unity never begins to come about without unity of organizational senses first taking place.

In this way, research regarding inverted vision involves two viewpoints; (1) that a change occurs in visual perception and vision becomes upright, and (2) that vision is not upright, but new learning takes place between visual and motor senses, and movement adaptation can occur. The question arises as to whether inverted vision is simply a matter of becoming accustomed, or a cooperation between sight, hearing, touch, and sense of body movement.

Therefore, the authors carried out an experiment regarding inverted vision to discover if vision can actually become upright as reported by Stratton, and to find out how the adaptation process affects both the body and the mind. This paper is a report on the psychological aspects of the experiment, and presents some considerations about the adaptation mechanism regarding inverse vision.

## SUBJECTS AND METHOD OF EXPERIMENTATION

### 1. SUBJECTS

The subjects used were four students at the Miyazaki Medical University. All were in good health and none had notably eccentric personalities. Table 1 shows their profile. To sum up each of their personalities by means of MMPI, CMI, MAS [expansions unknown] and Rorschach tests, E.U. tends to be defensive and restrained, M.T. is rather nervous, T.I. is gentle and naive, and T.F. is defensive and over-sensitive.



Table 1. Subjects' Profile

Name	Age	Sex	Psychological Tests Summary	
E. U.	24	♂	MMP I : プロフィール・コード 089217 L : F : K = 9 : 3 : 21	(1)
			CMI : 神経症判別図 領域 I	(2)
			MAS : anxiety score = 9, Liescore = 9	
			Rorschach : 内向性, 防衛的, 抑圧的, 配慮的, 全身的	(3)
			WAIS : IQ = 128	
M. T.	23	♂	MMP I : プロフィール・コード 56 2 L : F : K = 5 : 3 : 20	(4)
			CMI : 神経症判別図 領域 I	(5)
			MAS : anxiety score = 31, Liescore = 3	
			Rorschach : 内向性, 消極的, 過敏, 緊張	(6)
			WAIS : IQ = 134	
T. I.	23	♂	MMP I : プロフィール・コード 9-028751 L : F : K = 4 : 2 : 17	(7)
			CMI : 神経症判別図 領域 I	(8)
			MAS : anxiety score = 10, Liescore = 6	
			Rorschach : 内向的(等価型), 活動的, 野心的	(9)
			WAIS : IQ = 140	
T. F.	23	♂	MMP I : プロフィール・コード 1-70825469 L : F : K = 6 : 3 : 14	(10)
			CMI : 神経症判別図 領域 I	(11)
			MAS : anxiety score = 3, Liescore = 2	
			Rorschach : 内向性, 受身的, 過敏, 緊張	(12)
			WAIS : IQ = 140	

Key: (1) Profile code; (2) Nervous symptoms diagram, Territory 1; (3) Introverted, defensive, oppressive, considerate, receptive; (4) Profile code; (5) Nervous symptoms diagram, Territory 1; (6) Introverted, negative, oversensitive, tense; (7) Profile code; (8) Nervous symptoms diagram, Territory 1; (9) Introverted (equivalent type), active, ambitious; (10) Profile code; (11) Nervous symptoms diagram, Territory 1; (12) Introverted, receptive, oversensitive, tense.

## 2. EXPERIMENTATION METHOD

### (1) Reversing lenses;

Reversing prism glasses made by Takei Manufacturing were used.

### (2) Psychological tests:

The various psychological tests shown in Table 2 were performed while the subjects wore the reversing lenses.

### (3) Procedure of experiment:

The daily schedule shown in Table 2 was followed. The subjects were divided up into two groups, one consisting of E.U. and M.T., and the other consisting of T.I. and T.F. Each group was admitted to the medical

facility of the university and asked to wear the reversing lenses. However, they did not wear the glasses during the 30 minutes before and 30 minutes after meals, for 20 minutes while bathing, when writing in their journals before going to bed, and when making DAP (pictures of people).

Table 2. Daily Schedule of Psychological Tests

Sub- ject	Previous day	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
E.U.	Rorschach test	Kraepelin test		Kraepelin test		Kraepelin test		Rorschach test
	Kraepelin test							Kraepelin test
	MMPI							
	CMI							
M.T.	MAS			MAS				MAS
	SCT							
	Bender- Gestalt		Bender- Gestalt		Bender- Gestalt		Bender- Gestalt	Bender- Gestalt
	Pegboard	Pegboard		Pegboard		Pegboard		Pegboard
	WAIS							
T.I.		Rorschach test						Rorschach test
	Y-G							
	MMPI							
	CMI							
	MAS	MAS		MAS		MAS		MAS
	SCT							
T.F.	Benton's sight inscrip- tion	Benton's sight inscrip- tion	Benton's sight inscrip- tion	Benton's sight inscrip- tion		Benton's sight inscrip- tion	Benton's sight inscrip- tion	Benton's sight inscrip- tion
	DAP	DAP	DAP	DAP	DAP	DAP	DAP	DAP
	WAIS							

Note: "Previous day" on the chart means the day prior to the experiment when the above psychological tests were performed without wearing the invert-  
ing glasses.

## RESULTS

Table 3 shows the results of the various psychological tests. Following is a breakdown of each test.

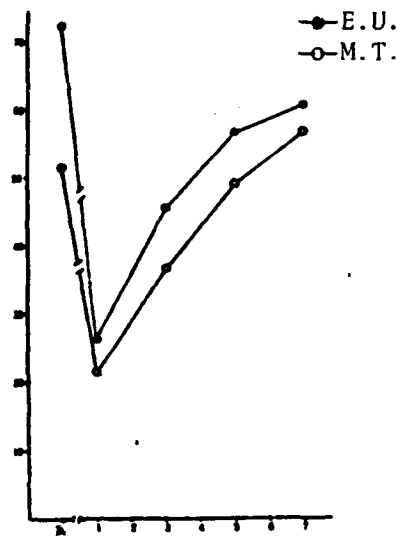
Table 3. Psychological Tests Data

Name	Tests	(1) 前日	(2) 1日	(3) 2日	(4) 3日	(5) 4日	(6) 5日	(7) 6日	(8) 7日
(9)	クレペリン テスト	(10) 平均作業量	72.5	25.9	45.1		36.7		60.4
(11)	ベンダー ゲシュタルト	total time	174"		635"	307"		239"	228"
		score	9		71	26		38	21
E. U.		M	30	8	14		14		18
(12)	ペグボード	N	30	19	24		27		26
		anxiety	9		17				10
	M A S	Lie	9		10				9
(13)	クレペリン テスト	(14) 平均作業量	51.6	21.3	36.4		49.5		57.3
(15)	ベンダー ゲシュタルト	total time	168"		460"	395"		303"	210"
		score	3		24	6		4	0
M. T.		M	30	12	12		16		16
(16)	ペグボード	N	25	20	21		24		27
		anxiety	31		13				5
	M A S	Lie	3		10				7
(17)	ヘント	(18) 正解数	10	7	10	9	10	10	10
		(19) 誤答数	0	3	0	1	0	0	0
T. I.		anxiety	10	14		14	11		11
	M A S	Lie	6	4		5	4		4
(20)	ヘント	(21) 正解数	10	7	10	10	10	10	10
		(22) 誤答数	0	4	0	0	0	0	0
T. F.		anxiety	3	2		5	2		2
	M A S	Lie	2	1		1	1		1

Key: (1) Previous day; (2) 1st day; (3) 2nd day; (4) 3rd day; (5) 4th day; (6) 5th day; (7) 6th day; (8) 7th day; (9) Kraepelin test; (10) Average amount of work; (11) Bender-Gestalt; (12) Pegboard; (13) Kraepelin test; (14) Average amount of work; (15) Bender-Gestalt; (16) Pegboard; (17) Benton; (18) Number correct; (19) Number incorrect; (20) Benton; (21) Number correct; (22) Number incorrect.

### (1) KRAEPELIN TEST

Figure 1 shows a graph of the average amount of work of the Kraepelin test, and Table 4 shows the similar curve types. As can be seen in Fig. 1, the average amount of work shows an abrupt increase. It is noteworthy that in the case of M.T., the amount of work for the 7th day outstretches the amount of work done before the lenses were worn. The similar type curves also improved gradually, but were abnormal; and on the seventh day shifted to doubt



\*Previous day

Fig. 1. Kraepelin Test

Vertical axis shows the average amount of work; horizontal axis indicates the day of the experiment.

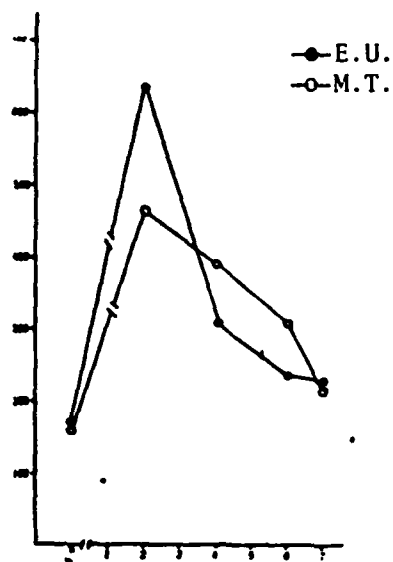
Table 4. Similar Curve Types of Kraepelin Test

	Previous day	Day 1	Day 3	Day 5	Day 7
E.U.	auF	cP	aP	aP	aF
M.T.	a	dP	bF	aF	a

type. M.T. went from abnormal type to doubt type, and on the seventh day even improved to standard type.

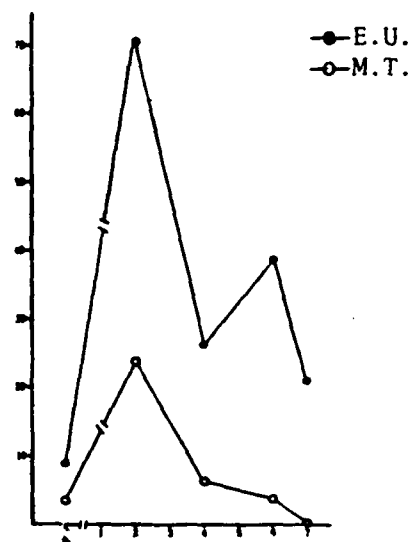
## (2) BENDER-GESTALT TEST

Figure 2 shows a graph of the total time of the Bender-Gestalt test, and the total score is shown in Fig. 3. From the graph, it can be seen that both the total time and total score decreases gradually. Figures 4 and 5 show the results of drawing. Distortion can be seen easily in the drawings made on the second day (shown on the right) as compared with those made before putting on the lenses (shown on the left).



\*Previous day

Fig. 2. Bender-Gestalt Test  
Vertical axis is total time;  
horizontal axis indicates  
day of experiment.



\*Previous day

Fig. 3. Bender-Gestalt Test  
Vertical axis is the total  
score; horizontal axis indi-  
cates day of experiment.

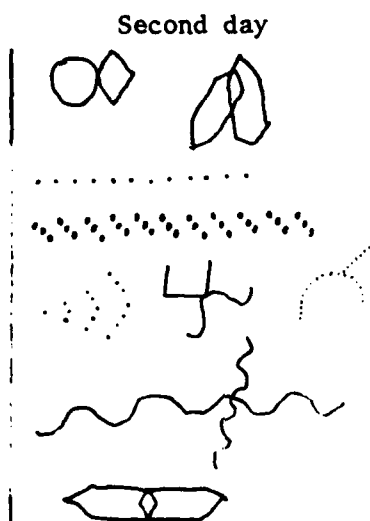
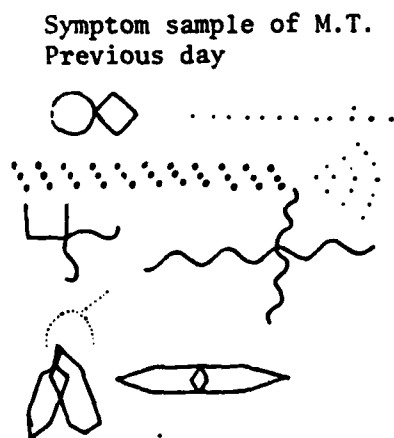
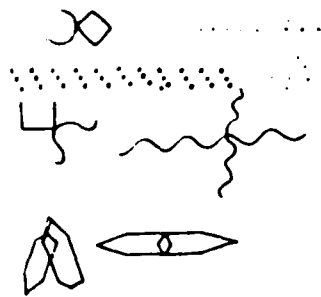


Fig. 4. Bender-Gestalt Test

Symptom sample of M.T.  
Previous day



Second day

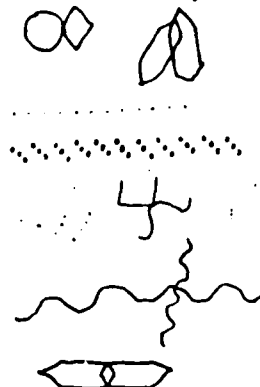


Fig. 5. Bender-Gestalt Test

[Translator's Note: This translation is faithful to the original, even though Fig. 5 appears to be simply a reduced duplicate of Fig. 4.]

### (3) BENTON'S EYESIGHT INSCRIPTION TEST

As shown in the above-mentioned Table 3, the results of the Benton Eyesight Inscription test show improvement up to the point where after three days there were almost no errors. This test was first performed to check the index of non-inverted sight normalization, rather than being used as an inscription test. In other words, if upright vision could have taken place, the subject would look at the figure, visualize it in his mind, and then make a figure in the drawing stage that was inverted 180° (upside-down from the subject's point of view). However, inversion of the figure did not result. Figure 6 shows the state of the drawings. Much distortion can be seen when comparing the first day to the previous day, but some improvement can be seen on the second day.

Symptom sample of T.F.  
Previous day



First day



Second day



Symptom sample of T.I.  
Previous day



First day



Second day



Fig. 6. Benton's Sight Inscription Test

#### (4) PEGBOARD

The pegboard is a work test in which the subject inserts plastic pegs into holes. Test M measures how many pegs the subject can turn over and insert with both hands within 15 seconds, and test N measures the same thing using one hand and 30 seconds. As a result, the amount of work increased gradually, as shown in Table 3.

#### (5) MAS ANXIETY TEST

The anxiety scores and lie scores of the MAS anxiety test are shown in Table 3. Graph representations of these scores are shown in Figs. 7 and 8. Figure 7 shows the transition of the anxiety score, and Fig. 8 shows the change in the lie score. In the case of E.U., the anxiety level was low and the lie score high; M.T. showed a high degree of anxiety on the day before wearing the glasses, but this decreased on the third and seventh days. However, there is a characteristically high lie score for E.U. and M.T. on the third day. Both T.I. and T.F. had a low anxiety score and lie score, but T.F. did not respond to an average of twelve or more questions, thus indicating a defensive mental attitude.

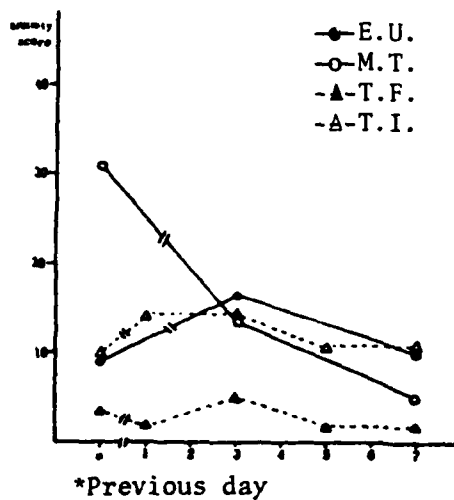


Fig. 7. MAS Anxiety Test  
Vertical axis is the anxiety score; horizontal axis indicates day of experiment.

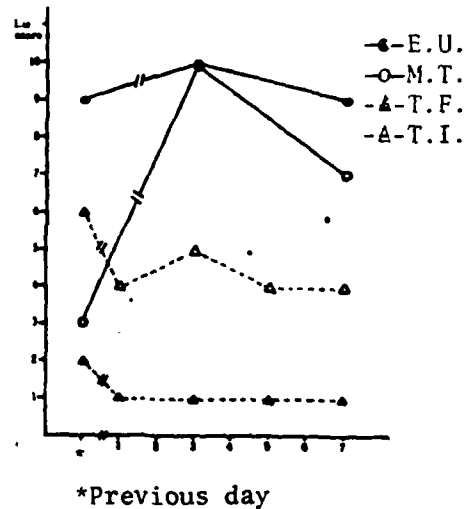


Fig. 8. MAS Anxiety Test  
Vertical axis is the lie score; horizontal axis indicates day of experiment.

# (6) RORSCHACH TEST

Table 5 shows the scores for the Rorschach test. From this chart, characteristics that were common to all subjects were the increase of FK responses (called vista responses) in which the test diagrams are seen as three-dimensional solids; the decrease in EC' black-and-white responses; and the increase of human responses H. Also, though not in all examples, three out of the four subjects indicated a decrease of inanimate movement responses, a decrease of CF+C obscure shape color responses, and a decrease in At analysis responses. Further results regarding responses showed a characteristic increase in responses referring to "eye" for both M.T. and T.F.

Table 5. Rorschach Test Summary Scoring Table

Name	E. U.		M. T.		T. I.		T. F.	
Ror. score	3.26	4.2	3.26	4.2	7.6	7.12	7.6	7.12
R (total response)	21	21	17	20	31	30	22	18
Rej	0	0	0	0	0	0	0	0
RiT (Av. N.C)	10.6'	11.2'	5.4'	13.8'	5.8'	2.4'	8.8'	14.8'
RiT (Av. C.C)	17.2'	12.6'	24.4'	13.	9.4'	2.8'	10.2'	23.6'
W	11	12	15	6	23	30	16	15
W %	52.4	57.1	88.2	30.	74.2	66.7	72.7	83.3
D	8	8	2	12	6	5	4	2
Dd	2	1	0	2	2	5	2	1
M	7	9	4	2	4	3	3	3
FM	7	8	0	0	7	3	10	3
m	1	0	0.5	0	1.5	1.5	0.5	1.5
FK	0.5	2	0	1	0.5	2	0	2
Fk	0	0	0	0	0	0	0	0
Fc	0.5	0.5	2	1	2.5	2	1	0
EC'	1	0	3	1.5	1	0	2	1
FC	0	0	0	2	1	0	1	0
CF+C	1	1.5	0.5	0	5	4.5	4	2.5
EC	0.5	1.5	0.25	1	3.5	4.5	4.5	2.5
F %	23.8	4.8	47.1	65.	41.9	53.3	27.3	61.1
R+ %	76.2	90.	76.5	80.	75.	59.3	81.8	66.7
P	6	4	6	4	4	5	4	1
A	8	11	4	7	12	14	6	7
H	7	8	4	4	4	4	3	4
At	2	0	1	0	1	1	0	1
Csym	0	0	0	0	0	0	0	0
Content Range	4	4	6	4	6	7	5	6
Most Delayed Card Time	X 47'	X 21'	X 58'	VI 29'	VI 14'	II 08'	III 14'	IX 37'
Most Disliked Card	X	IV	X	X	II	II	I	VI

# (7) DAP (FIGURE-DRAWING TEST)

T.I. and T.F. were asked to express their self-image and their perception



of their physical bodies in a drawing before the experiment and during the experiment. They were asked to make drawings both of their state with glasses off (on the day prior to the experiment) and of their state with glasses on (during the experiment) in conjunction with the time they wrote in their journals before going to bed with the glasses off. The results are shown in Figs. 9 and 10. In the case of T.I. in Fig. 9, hands and feet were emphasized on the first day, with arms extending upward from the rear side of the head instead of from the shoulders. On the second day, the body was poorly balanced and the head portion was large; on the third day, sight was emphasized, arms and legs were separated from the body, and feet were drawn above the head. On the fourth day, balance was still poor, and feet were faintly drawn above the head; on the fifth day, arms and legs that were almost normal were somewhat emphasized; and on the sixth day, the subject drew an overall balanced image.

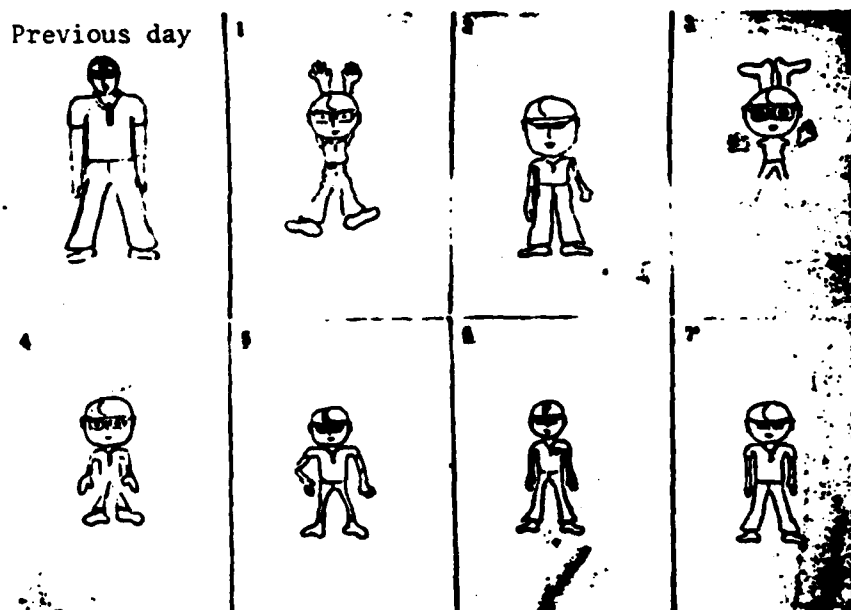


Fig. 9. DAP Sample of T.I.

In the case of T.F., in Fig. 10, arms and legs were separated at random from the body on the first day, and he states specifically that the hands would not go where he had thought they would [Translator's Note: The statements mentioned here are found in the writing accompanying the drawings in Fig. 10.]; on the second day, he claims that he became increasingly dizzy. On the third day, he says that hands have returned to some degree and that

legs were not controlled very well. On the fourth day, he felt that the head was huge and that the overall body seemed to sway; on the fifth day, he says that he has finally become accustomed. On the sixth day, he expresses that he feels he could adapt to either upright or upside-down vision; and on the seventh day, he drew a basically overall balanced figure.



Fig. 10. DAP Sample of T.F.

## CONSIDERATIONS

The authors attempted to discover the process of adaptation regarding an inverted vision experimental situation through various psychological tests and using reversing glasses; but as for the principal purpose of the experiment, which involved upright vision, none of the four subjects showed a clear inversion of vision. As for the second purpose of the experiment, which regarded the mechanism of adaptation to inverted vision, we would like to present a few considerations regarding characteristics of the adaptation process, first from the point of view of each of the psychological tests, and then from the point of view of the personality characteristics of each of the subjects.

## 1. Adaptation Mechanism as Relating to Psychological Testing

As the experiment proceeded with work tests involving sight, such as the Kraepelin test, the Bender-Gestalt test, the Benton sight inscription test, and the pegboard, a gradual increase in the amount and quality of work was noticed. This is along the same line as the point researched by Ewert[1], J. Peterson, and J. K. Peterson (1938), involving the adaptation towards inverted vision by means of a so-called "on-looker's type test." By measuring the amount of work, number of errors, time required, etc., and with a learning curve, a progressive process towards obvious "adaptation" is merely shown. Furthermore, the doubt arises as to whether or not the measurement of the active adaptation can be thought appropriately of as measurement of inverted visual perception. Following is an observation of the mechanism of perceptual adaptation based on the results of the Rorschach and DAP tests, and on the journal reports of the subjects.

First, in the Rorschach test, the increase of vista responses for figures perceived in three-dimensional view, and the increase of responses referring to the "eye," could have been caused by putting on reversing glasses, which makes the outer world, objects, and reports of other persons difficult to grasp accurately. Therefore, the subject easily becomes oversensitive to the distance between himself and objects. In addition, symptoms of isolation were experienced, such as feelings of incompatibility with the outer world, a sense of unreality, faulty understanding of scenery due to abnormal space perception, a lack of freshness, sense of not fitting, and feelings that distance cannot be perceived. This is due to confusion regarding psychological and physical distance between the self and the outer world, shaking and reorganization, and the mechanism of reuniting; and is surmised to be the cause of the increase of vista responses and also those referring to the "eye."

In the DAP, self images were drawn with arms and legs detached. This is due to a floating, unreal, and unstable space brought about by the swaying of vision through reversing glasses. That space seems to exist as space which is viewed, such as a television or movie screen, generating a gap between it and the self; and the self cannot be placed within that space. When reversing glasses are worn and the head is facing down, or the eyes are looking down,

one's own body confronts itself by looking back at itself. In other words, it seems that one is divided up into one observing (perceived by internal sensation) and one being observed; the normal system of perceiving the external world is destroyed, and an image of arms and legs being cut off from the body is strongly sensed with a corresponding self image coming forth.

Stratton (1896)[15] reports that the separated "two selves" were completely reunited on the fifth day of the experiment, and that however much one searched, the self became one, connected from the head to the chest, abdomen, and feet. As C.S. Harris (1955)[3] points out regarding this point, it seems that this is because the position of the body perceived by a sensation of self-acceptance changes. Moreover, Harris insists, "the sense of touch does not instruct the sense of sight, but the sense of sight makes the sense of touch." Harris refutes the opinion that the sense of touch, sense of position, and sense of self-acceptance are more basic and unchangeable, and that the sense of sight is more changeable. However, the authors feel doubtful about Harris' opinion. The reason for this is the journal reports made by the subjects of Nakao (1980)[9][10]. According to them, the subjects felt strongly the sense of touch, together with a reversing of their field of vision, on the second day of wearing reversing glasses, and unreasonable actions gradually decreased; on the third day, they experienced a violent conflict between the sense of sight and other body senses and movements. On the last day of the experiment, which was the seventh day, it was reported that they felt they could ride a bicycle the moment they sat on the bicycle seat. Also, according to Nakamura (1979)[11], "the sense of touch does educate the sense of sight, but sight once learned immediately leads the sense of touch, giving it direction, and that relationship becomes habitual." Nakamura continues on to say that basic things are sensed by touch in the end. From the journals made by the subjects and from Nakamura's point of view, it seems that the union of the senses of touch and sight undeniably play an important role in the mechanism of perceptual adaptation with regard to an inverted field of vision.

## 2. Personality Characteristics and Adaptation Mechanism of Subjects

Following are a few considerations regarding the adaptation to inverted vision as relates to the personality characteristics of the subjects.

(1) E.U.

E.U. tends to be defensive, suppressive, and considerate; and due to limited flexibility in thinking, he exerted an excess amount of energy in tests which measure work, such as the Kraepelin test and the Bender-Gestalt test. He tired easily and made many errors. His anxiety level in the MAS test was low, but his lie score was high, showing a consistent defensive attitude. In the Rorschach test, he freely expressed his feelings, a decrease in anxiety and hostility was seen, and an increase was noticed in reality; but it was discovered that external control of emotions decreased somewhat.

(2) M.T.

M.T. had a delicate, nervous personality, and he showed a gradual increase in amount of work in the Kraepelin test and the Bender-Gestalt test, and a decrease in the number of errors as the days passed. The MAS test indicated a high level of anxiety on the day prior to the experiment, which gradually decreased, and his lie score decreased after increasing on the third day, which was the most psychologically stressful period. Also, color shock in the Rorschach test disappeared, his emotions gradually stabilized, his thinking was flexible, and an increase of free expression of feelings and reality was seen.

(3) T.I.

T.I. has a naive and gentle personality, with a low anxiety level and lie score in the MAS test. In the Rorschach test, human movement responses and animal movement responses both decreased, reality also decreased, and even in the contents of the responses, unification of emotions worsened. However, a gradual union of self-image and body image was discovered in the DAP.

(4) T.F.

T.F. has an overly sensitive and defensive personality. The anxiety level in the MAS test was low, but the test is not very reliable due to the large number of questions which were not answered. This seems to be caused by a defensive attitude. Color shock appeared in the Rorschach test, configuration responses increased, a tendency toward suppression strengthened, and analytical responses and inanimate movement responses increased, thus indicating an increase in vague anxiety and a drop in reality. "Eye" response increased.

In other words, an increase of the oversensitive tendency was indicated.

Both E.U. and T.F. were very defensive subjects and that which was common in their adaptation was that the defensiveness did not relax, as can be seen by the MAS anxiety test. However, since E.U. had a strong desire to maintain a good reputation as viewed by others, he used up a large amount of mental energy in tests which measured work ability. On the other hand, T.F. was not concerned about how other people felt toward him and continued to be consistently defensive. An increasing tendency towards suppression was noticed. M.T. showed a gradual improvement in results of all the psychological tests, and although adaptation proceeded smoothly for him, integration of emotions worsened slightly for T.I., and a drop in reality was measured. This is presumed to be due to his naive personality and over-reaction to inverted vision, which is psychologically a very stressful condition.

As can be seen, the mechanism of adaptation is different in accordance with the personalities of each of the subjects. Though a general rule cannot be concluded, in an experimental situation having the psychological pressure and stress of an inverted field of vision, persons having a strongly defensive personality tend to become increasingly defensive and suppressive in order to protect themselves from a critical situation.

#### CONCLUSION

An experiment was performed regarding inverted field of vision using reversing glasses and four healthy subjects, who were male medical students. Various psychological tests were carried out and the significance of absence or presence of upright vision and the psychological mechanism involved in the adaptation process was discussed. Upright vision was not discovered during the first week of the experiment. As the days proceeded, improvement was seen in the results of tests which measure work ability, such as the Kraepelin test and the Bender-Gestalt test. On the other hand, the vista response of the Rorschach test, which is said to indicate distance between the subject and the external world, and responses referring to "eye" increased. In the DAP, a process was indicated whereby the disjointing of arms and legs from the self-image was reunited, and based on this, it was gathered that the unification of

sight and touch is strongly involved. This was again supported by the experiences reported by other subjects. Regarding adaptation to an inverted field of vision in view of the personality characteristics of the subjects, subjects who are defensive and suppressive develop an even more defensive and suppressive attitude when placed in a situation of inverted vision.

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